Relativistic Fe Kα line in bright Seyfert 1 galaxies

Giulia Mantovani
Paul Nandra, Gabriele Ponti

The X-ray Universe

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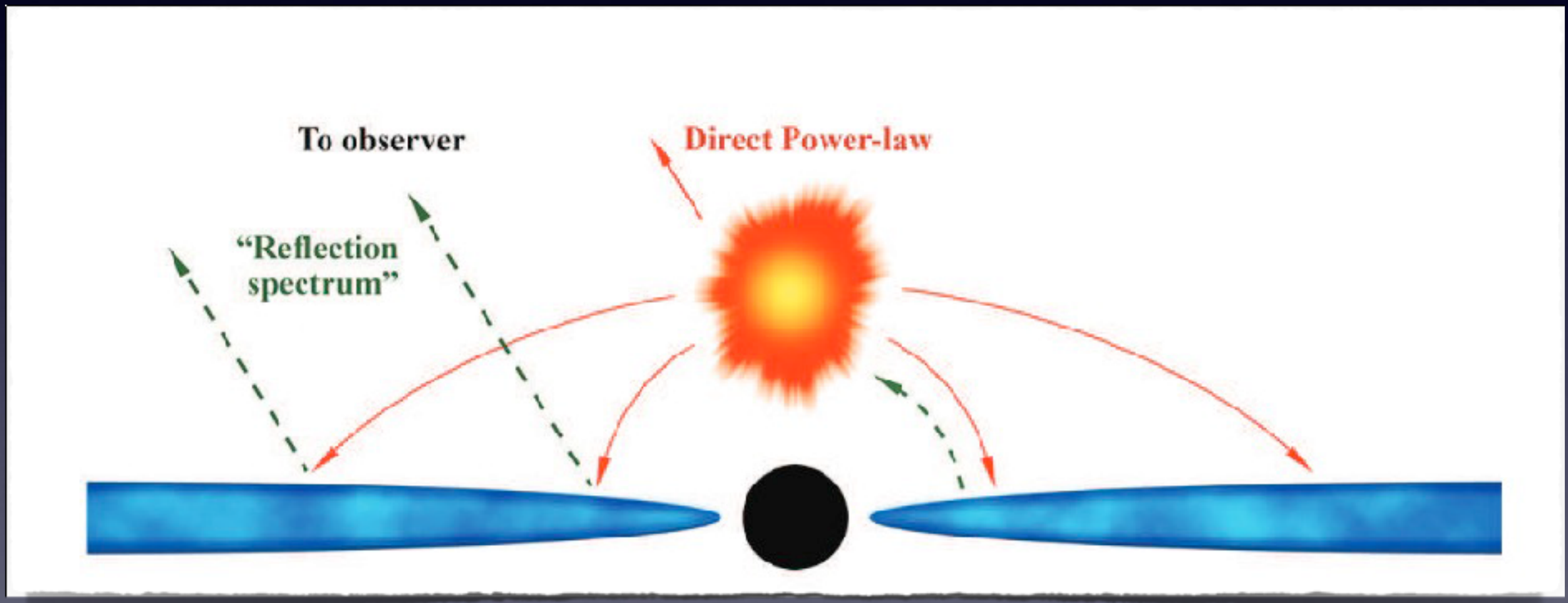
MAX-PLANCK-GESELLSCHAFT

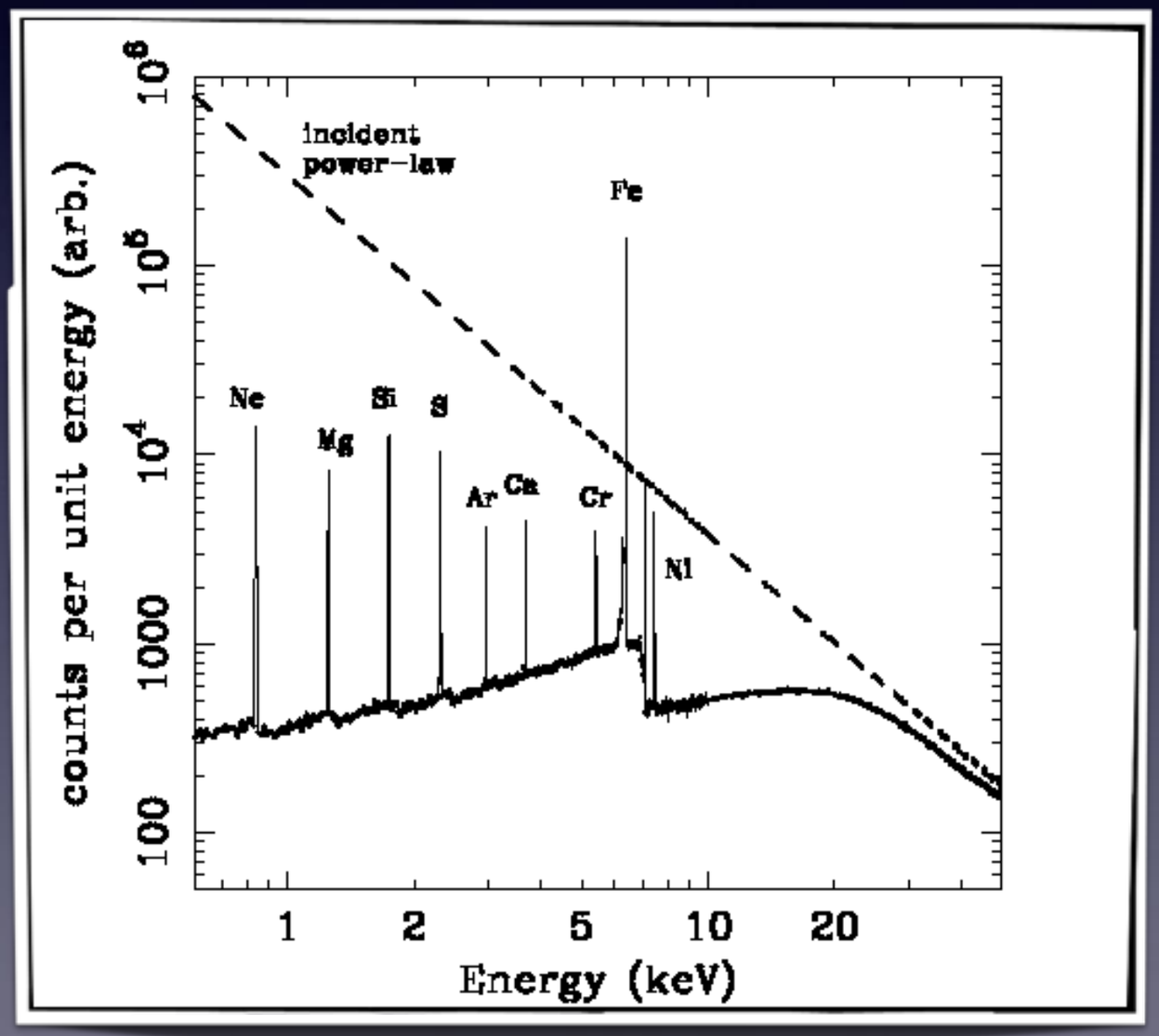
MPE

X-ray Emission



X-ray emission

The X-ray analysis is a fundamental key to probe the innermost regions of the AGNs.



Reynolds et al. 1995

- Continuum power law
- Fluorescence emission lines
- Compton Hump

Open Questions

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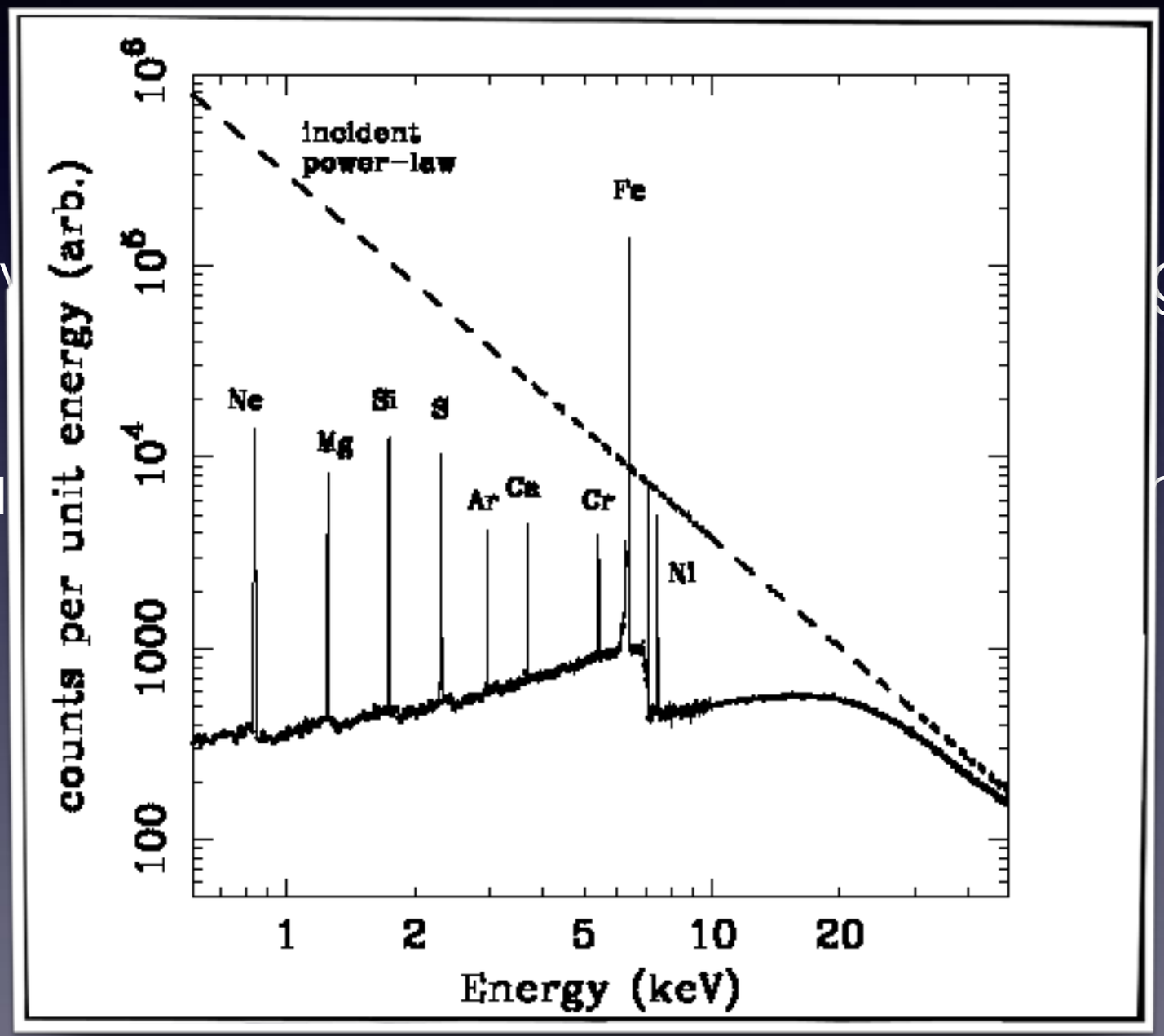

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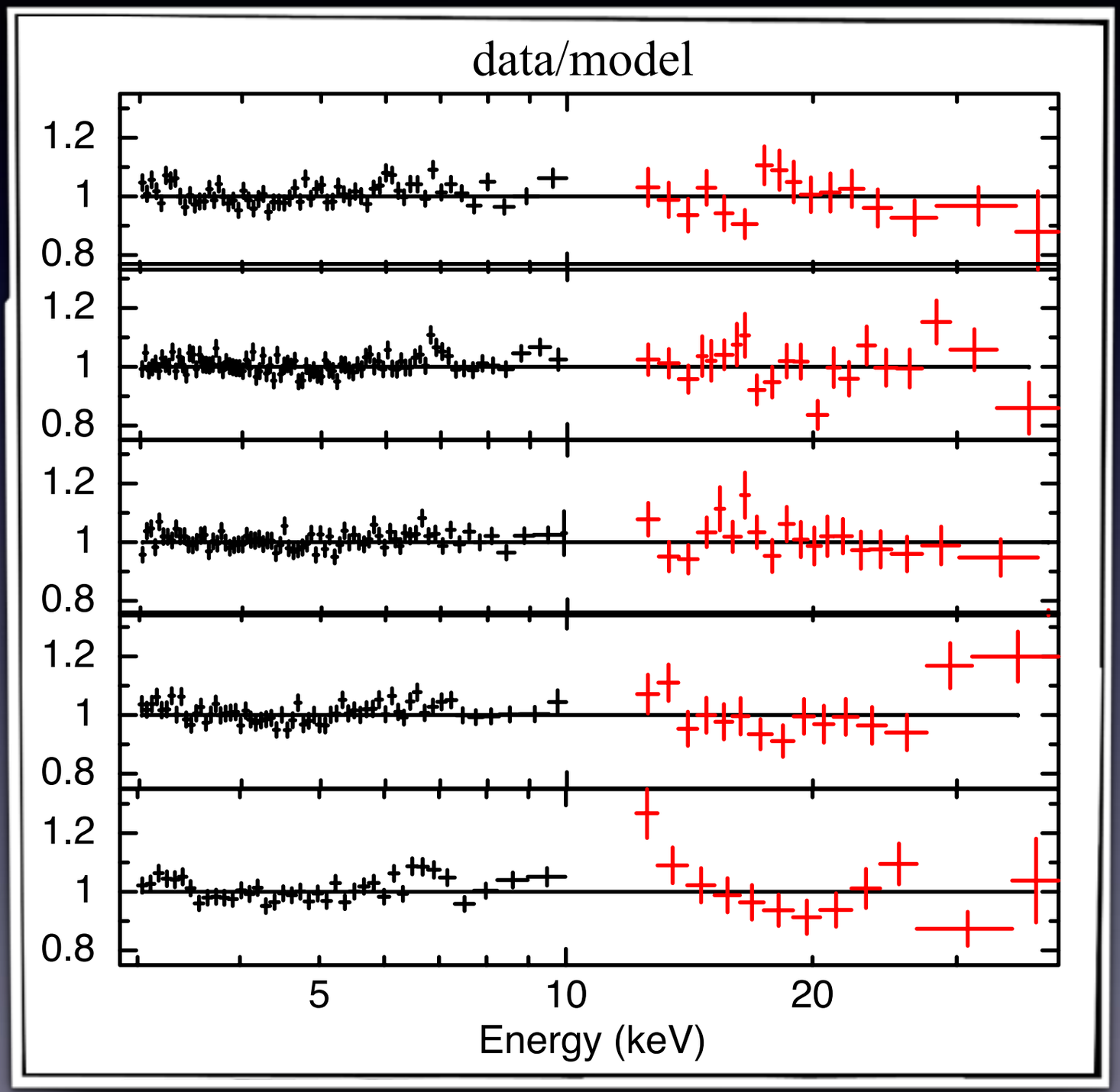
Sample of Seyfert 1 objects observed with Suzaku

IC 4329A

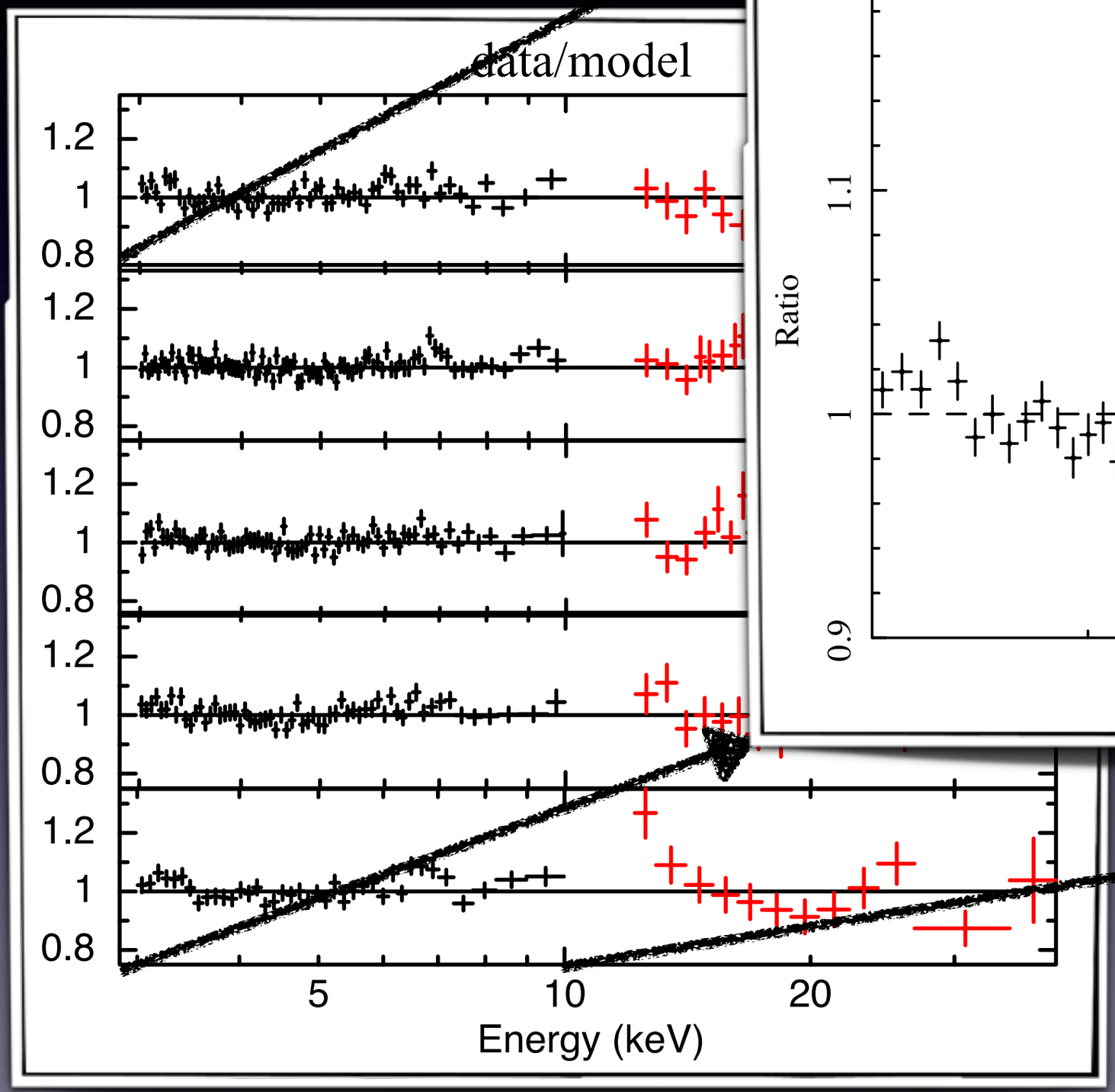


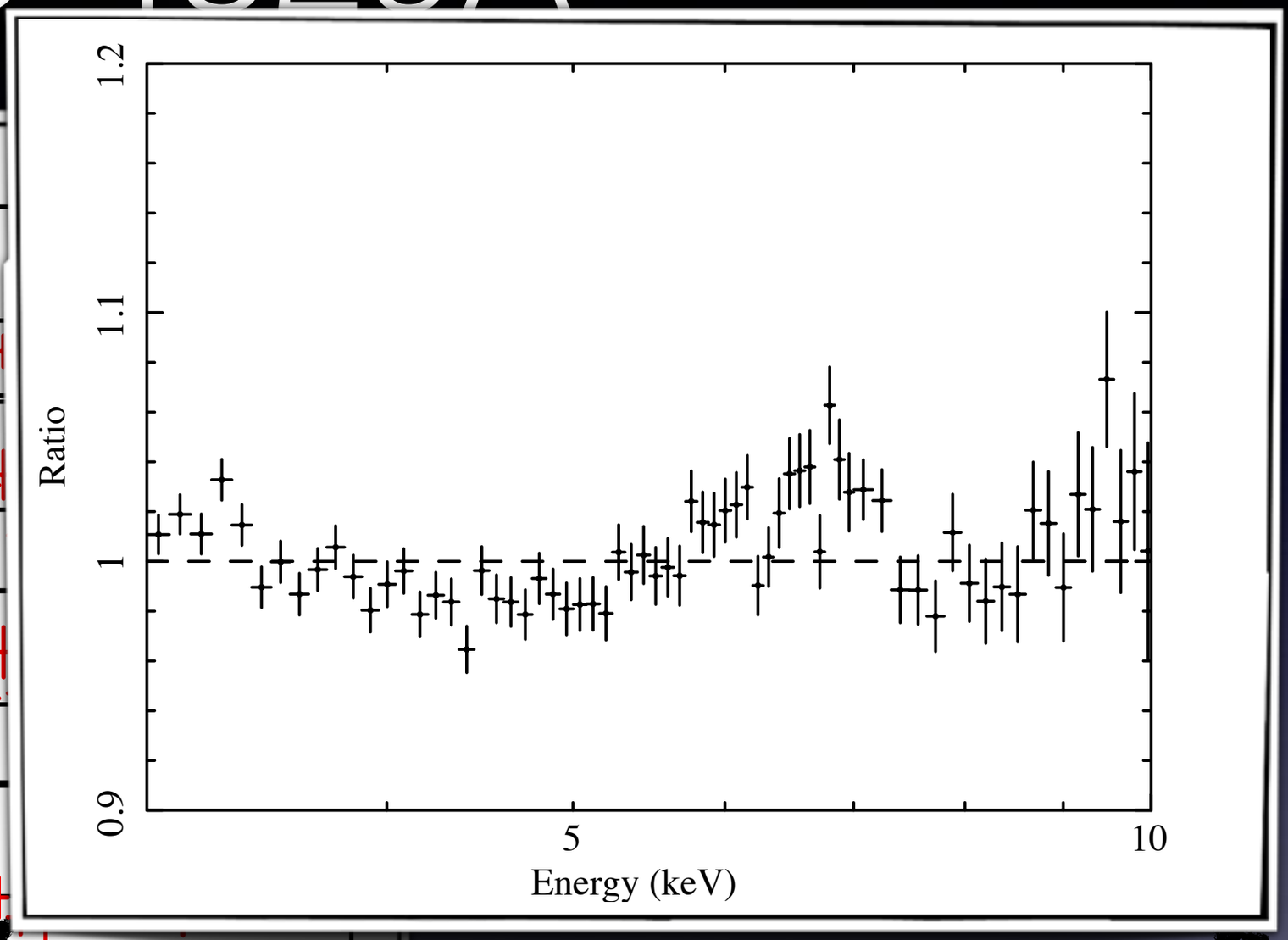
Significance between 2-4σ for single observation

Model:
zwabs*(pexrav+zgauss)

Mantovani et al. 2014

IC 4329A

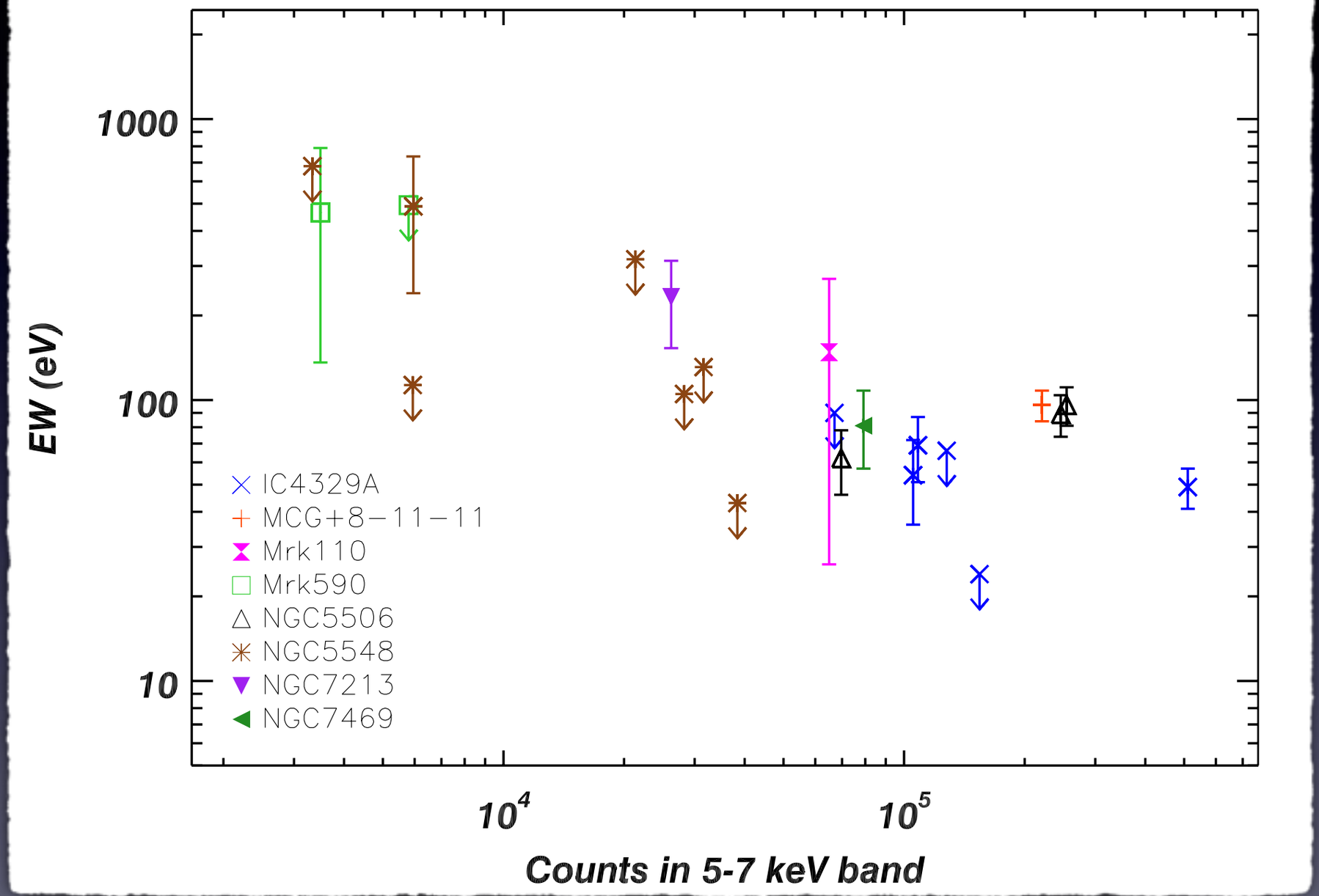




Model:
zwabs*(pexrav+zgauss+Laor)

Mantovani et al. 2014

Sample



Detections for counts > 4×10^4

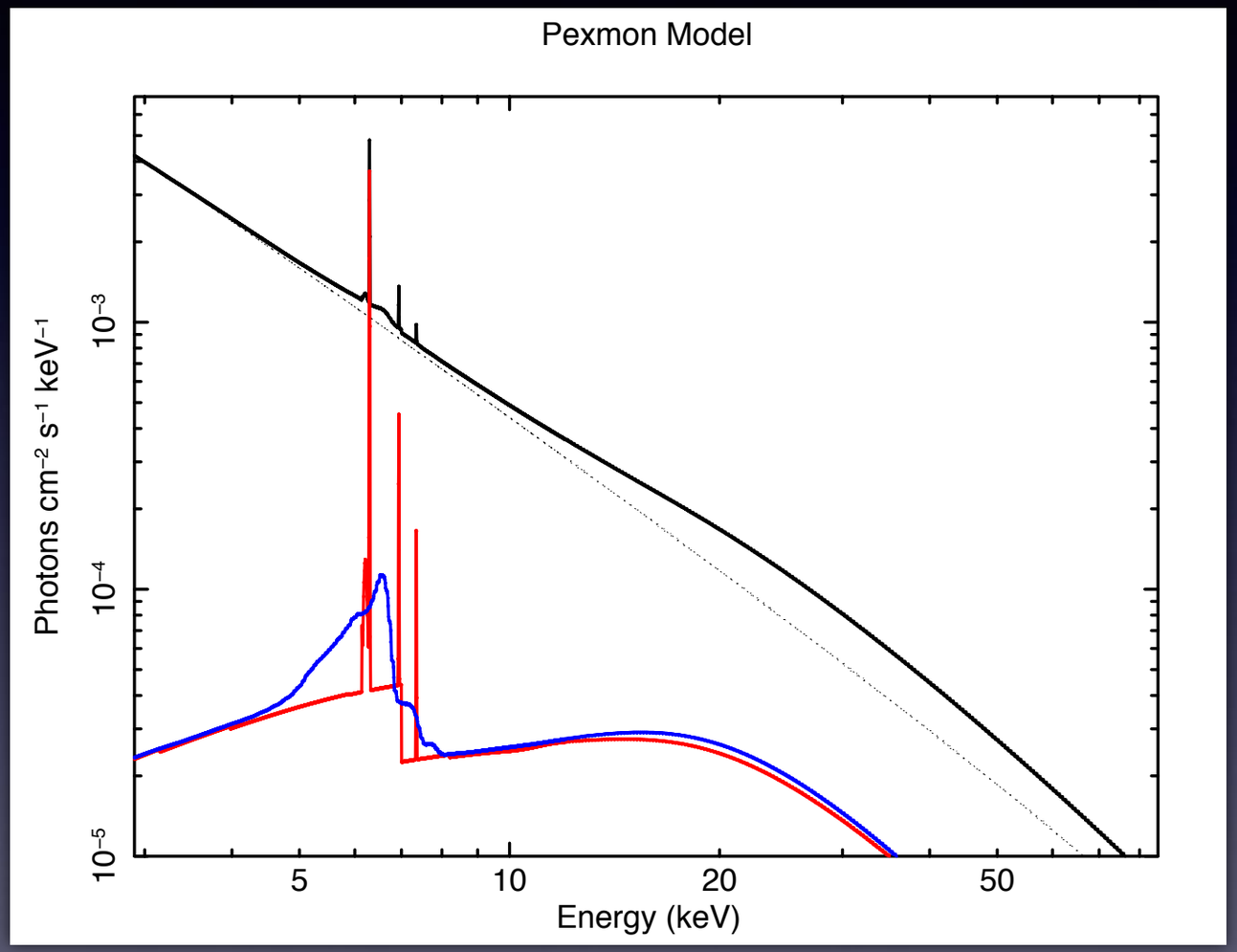
Relativistic Iron Ka line common feature in AGN

Model: pexrav+zgauss+relline

Mantovani et al. 2016

Relativistic Pexmon

Nandra et al. 2007



Fe Kα (6.4 keV), Fe Kβ (7.06 keV) flux 11.3% of Kα, Ni Kα (7.47 keV) flux 5% of Kα

Compton Reflection (pexrav)

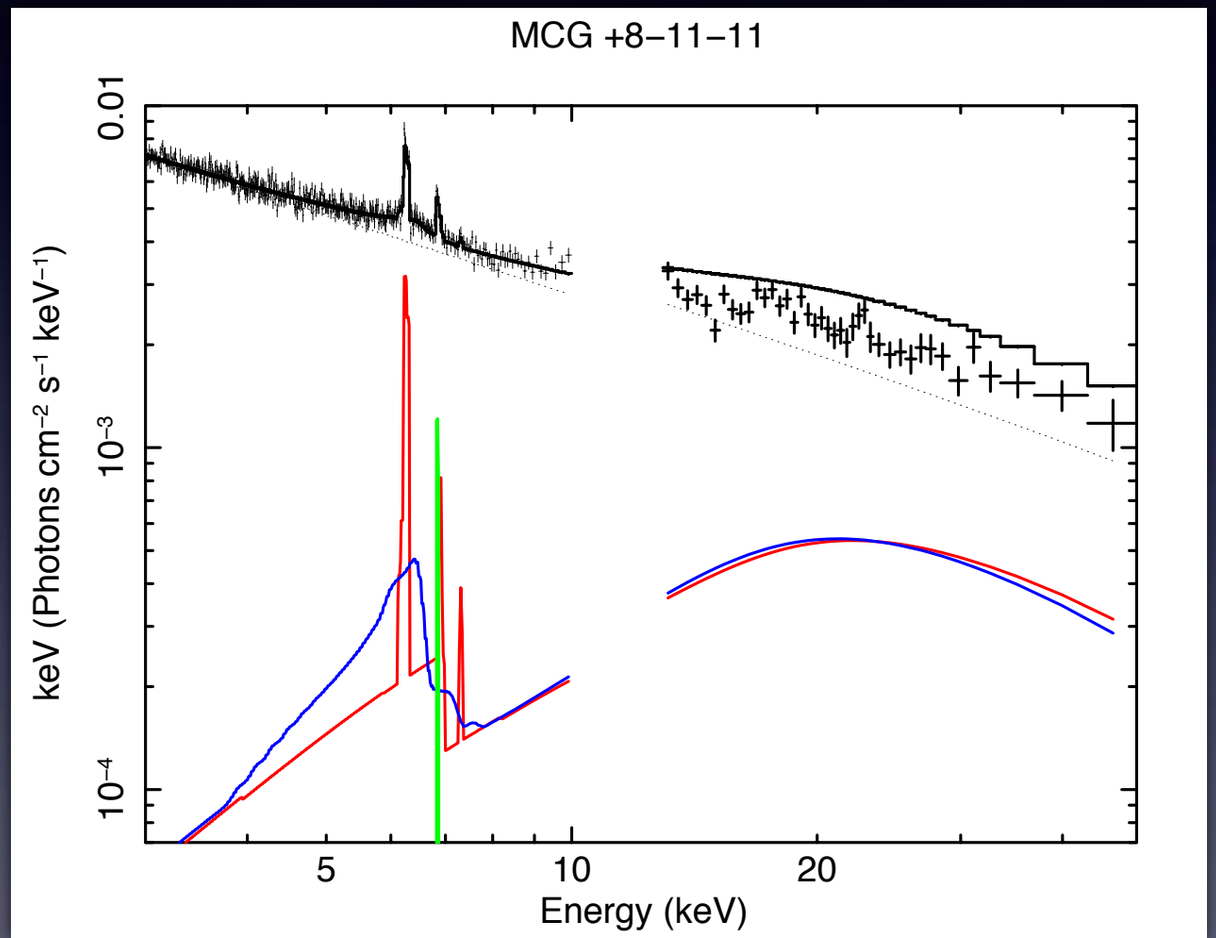
Fe Kα Compton shoulder

Fe Kα flux linked to Compton Hump

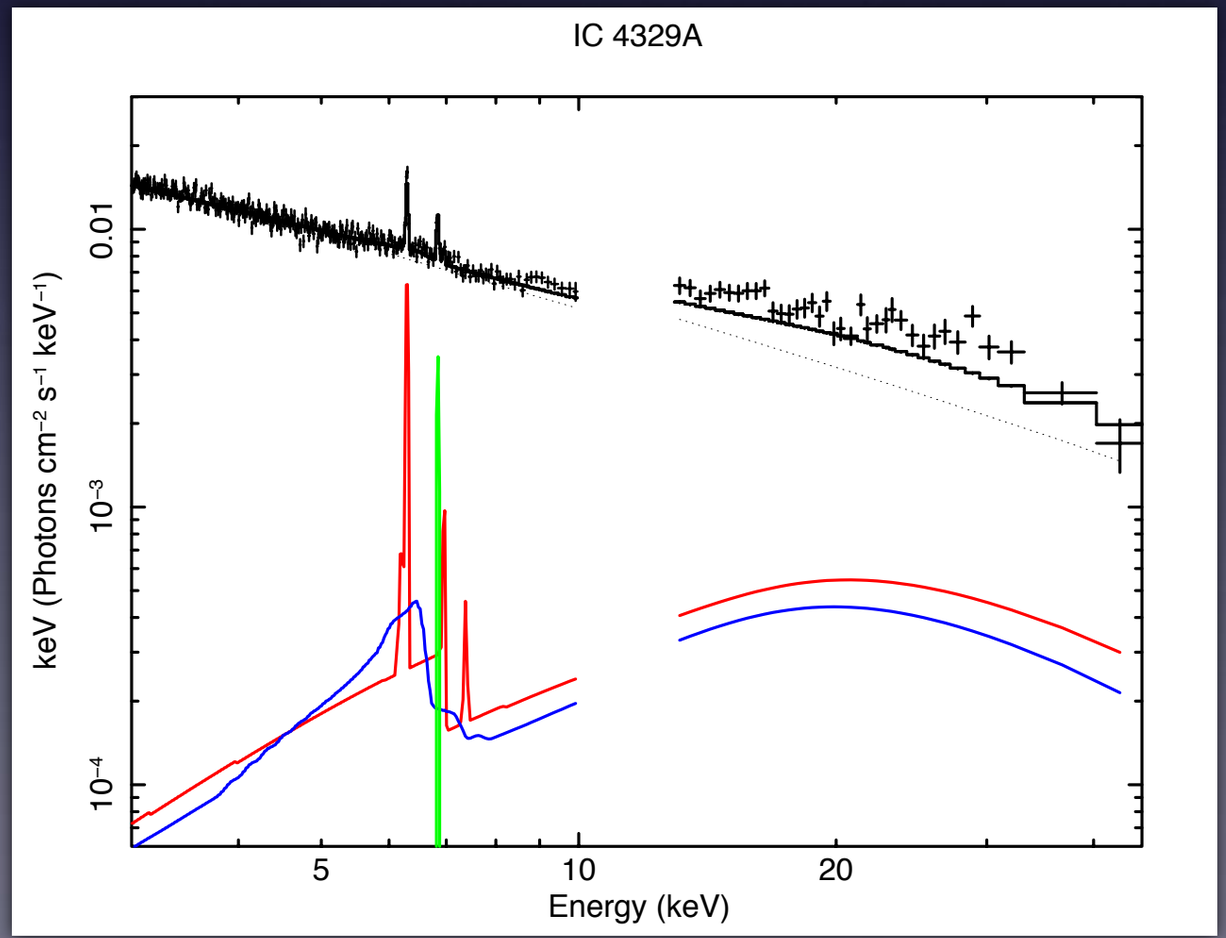
In general, the Pexmon model gives similar fit to the data compared to the phenomenological one

Mantovani et al. 2016

Relativistic Pexmon



MCG+8-11-11 $\Delta\chi^2/\Delta$ d.o.f. > 123/1



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Mantovani et al. 2016

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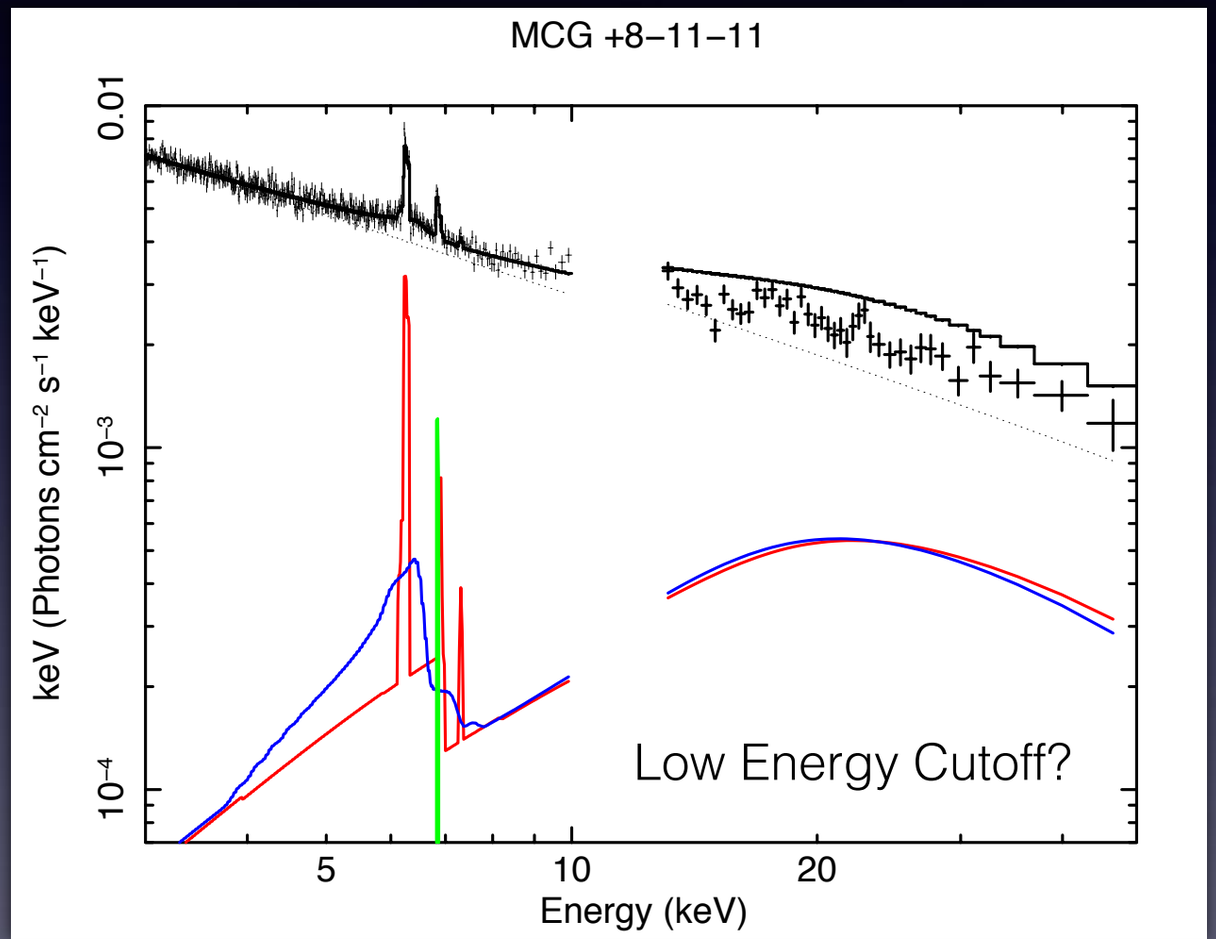

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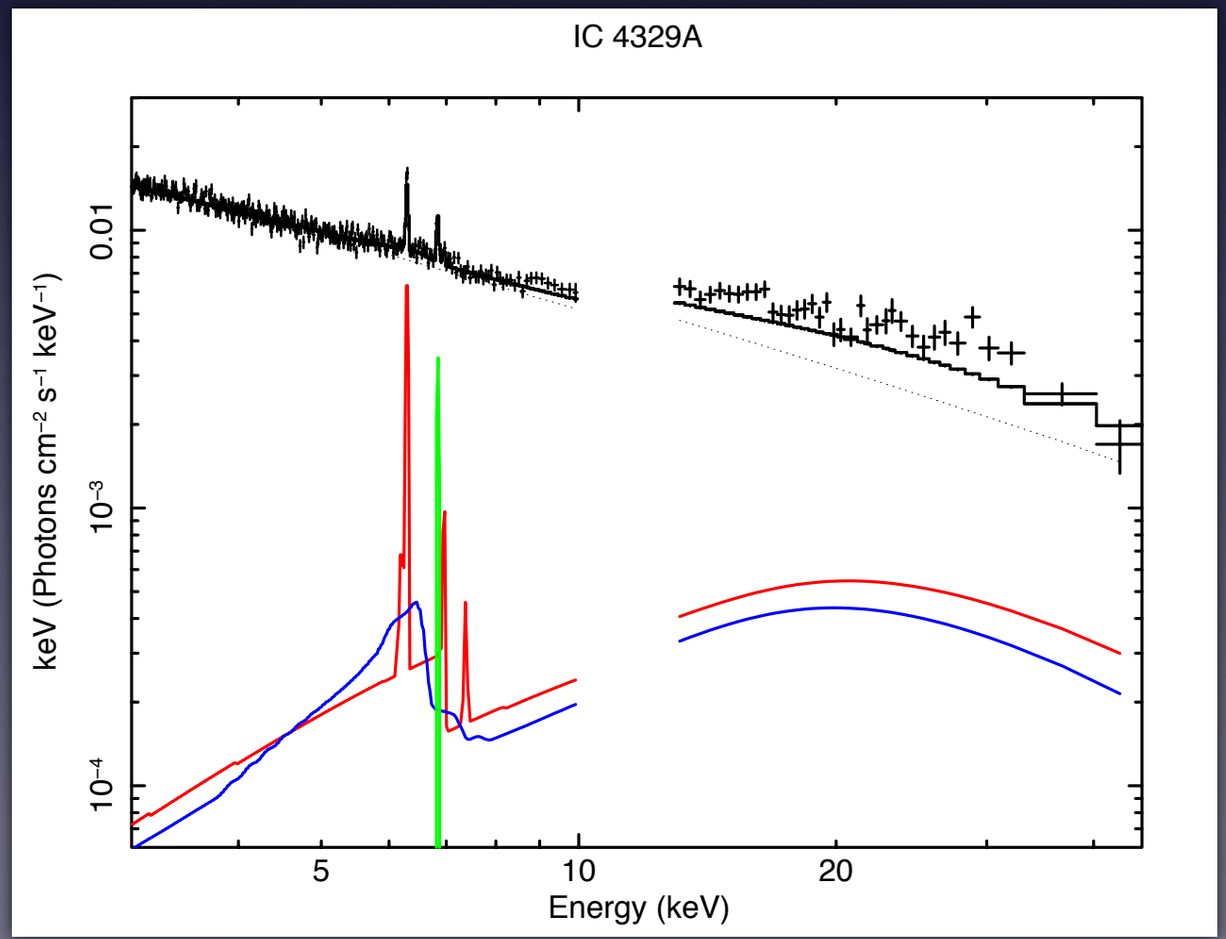

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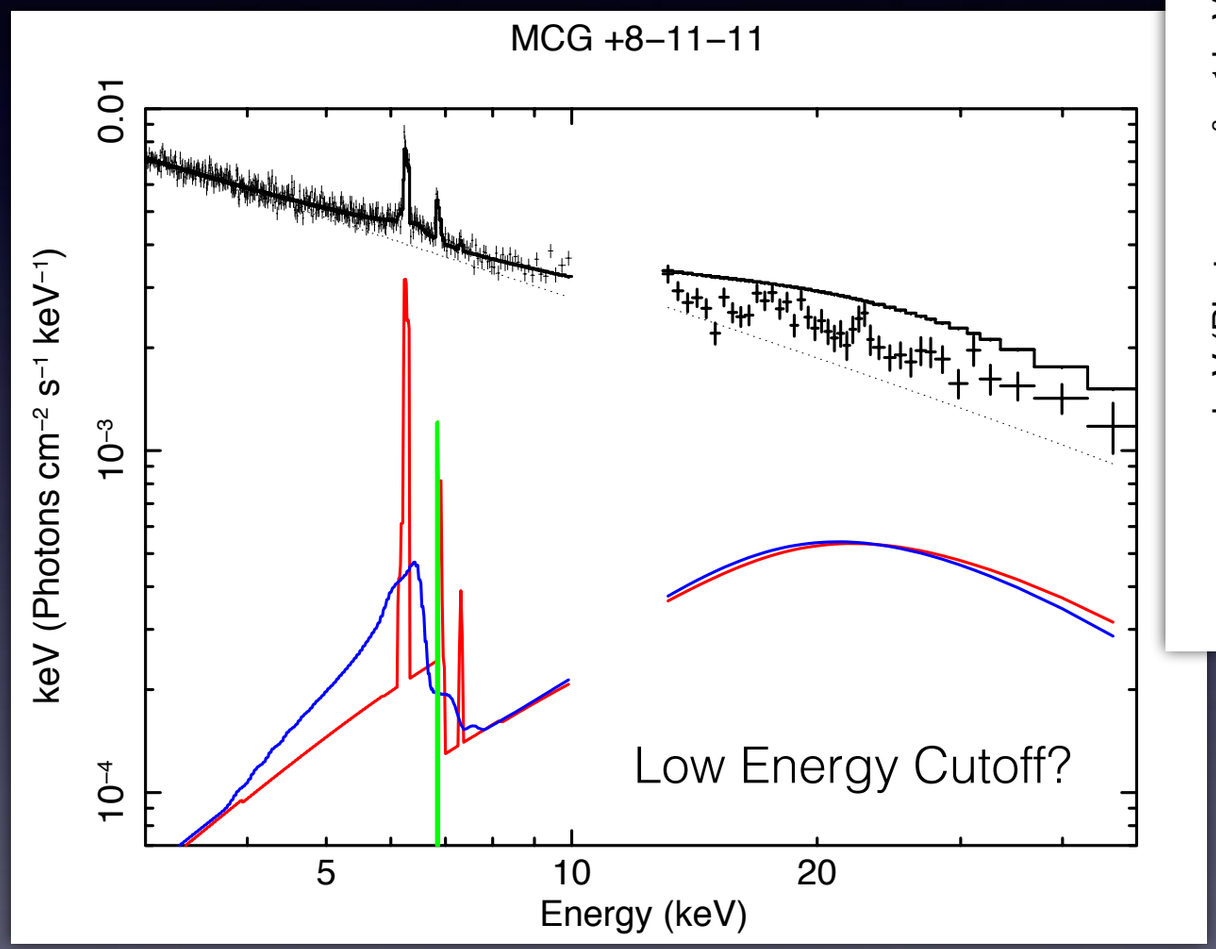

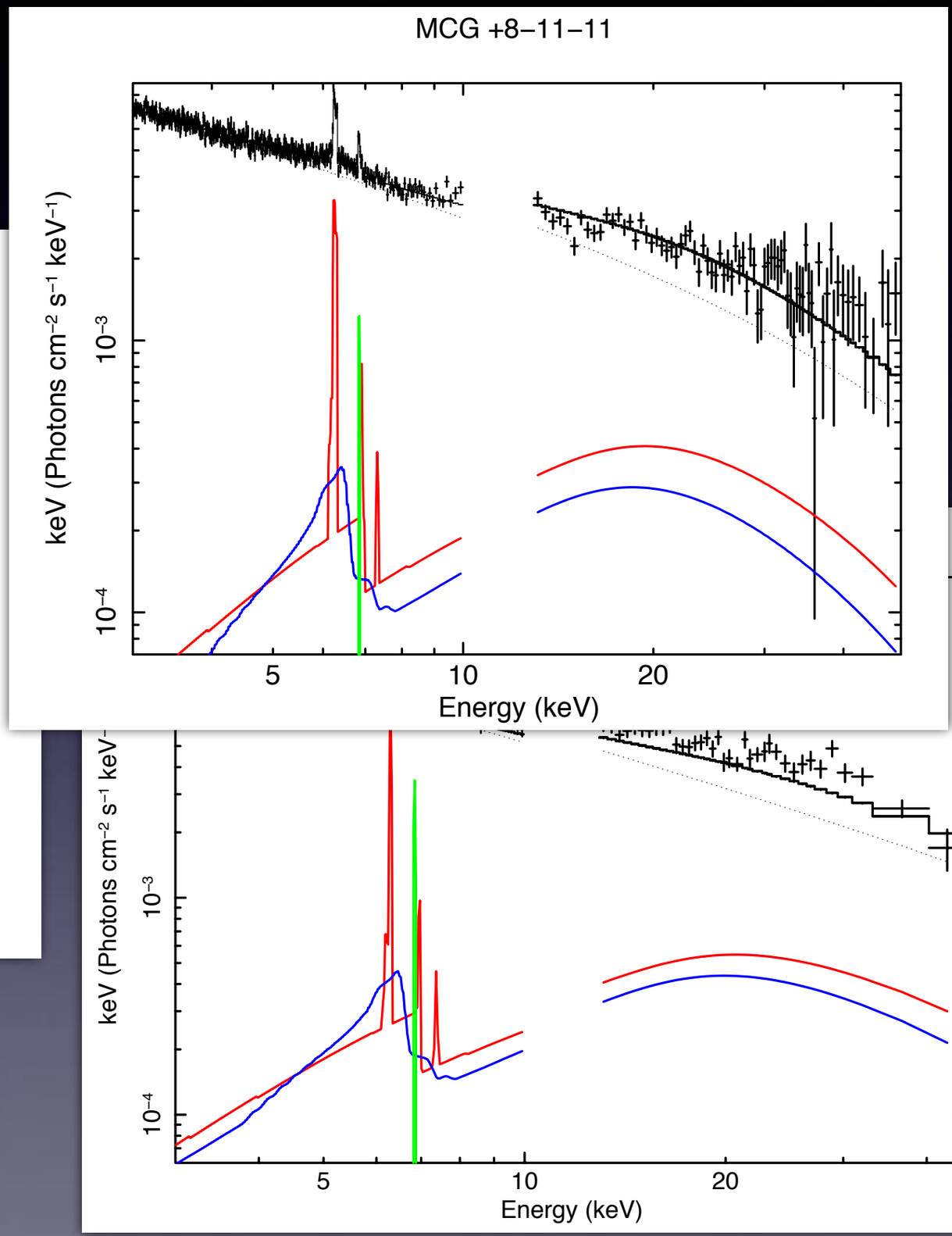

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Mantovani et al. 2016

The link between the Fe Kα line and Compton hump in NGC 4051

Further investigate the relation between Fe lines and reflection continua

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Taking advantage of high sensitivity in the hard band of NuSTAR spectra

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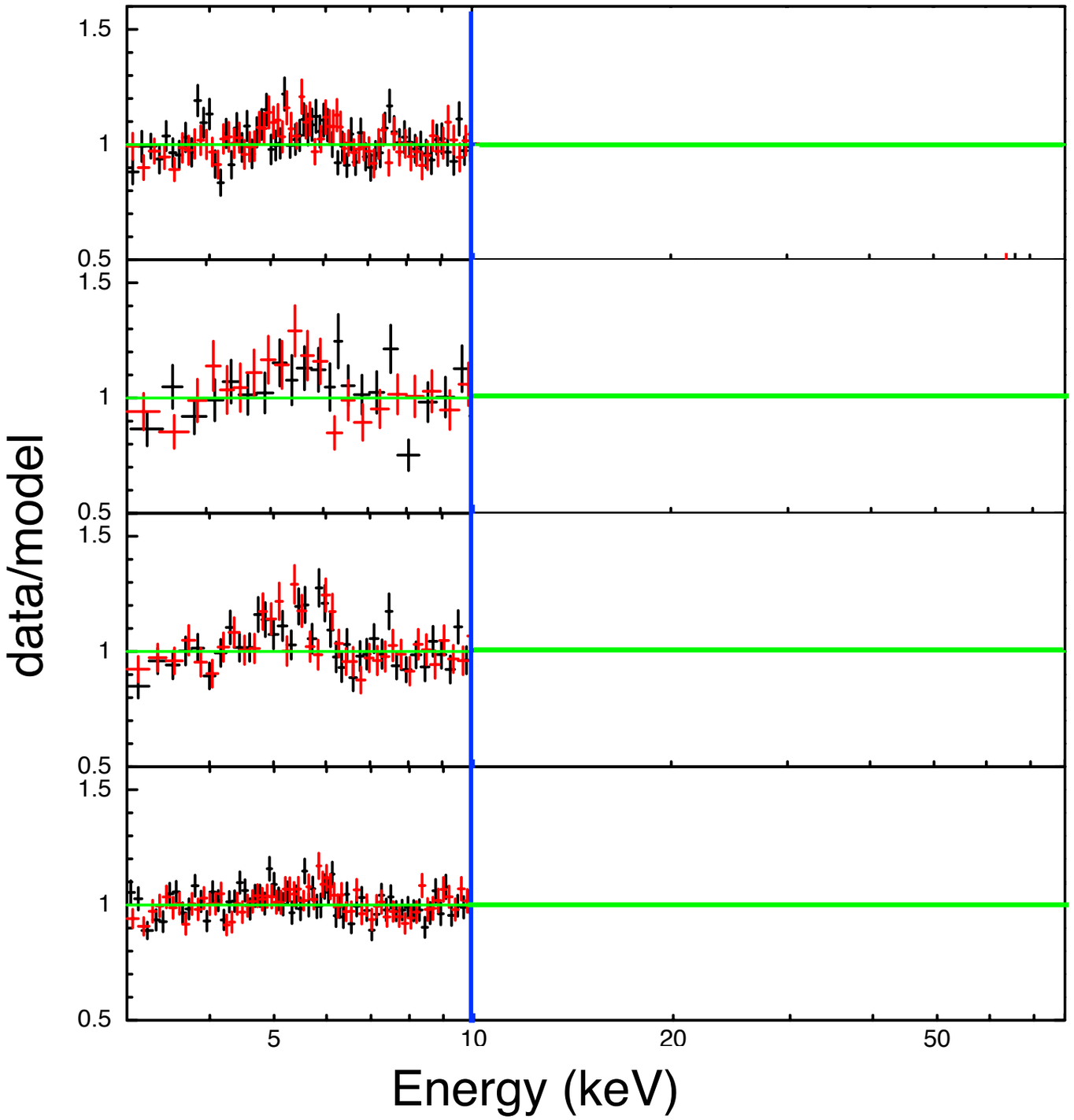
NGC 4051

↓

Strong relativistic Fe line in NuSTAR data

The link between the Fe Kα line and Compton hump in NGC 4051

Mantovani et al., under sub.



Residuals at 6.4 keV

Model: (cutoffpl+pexmon)

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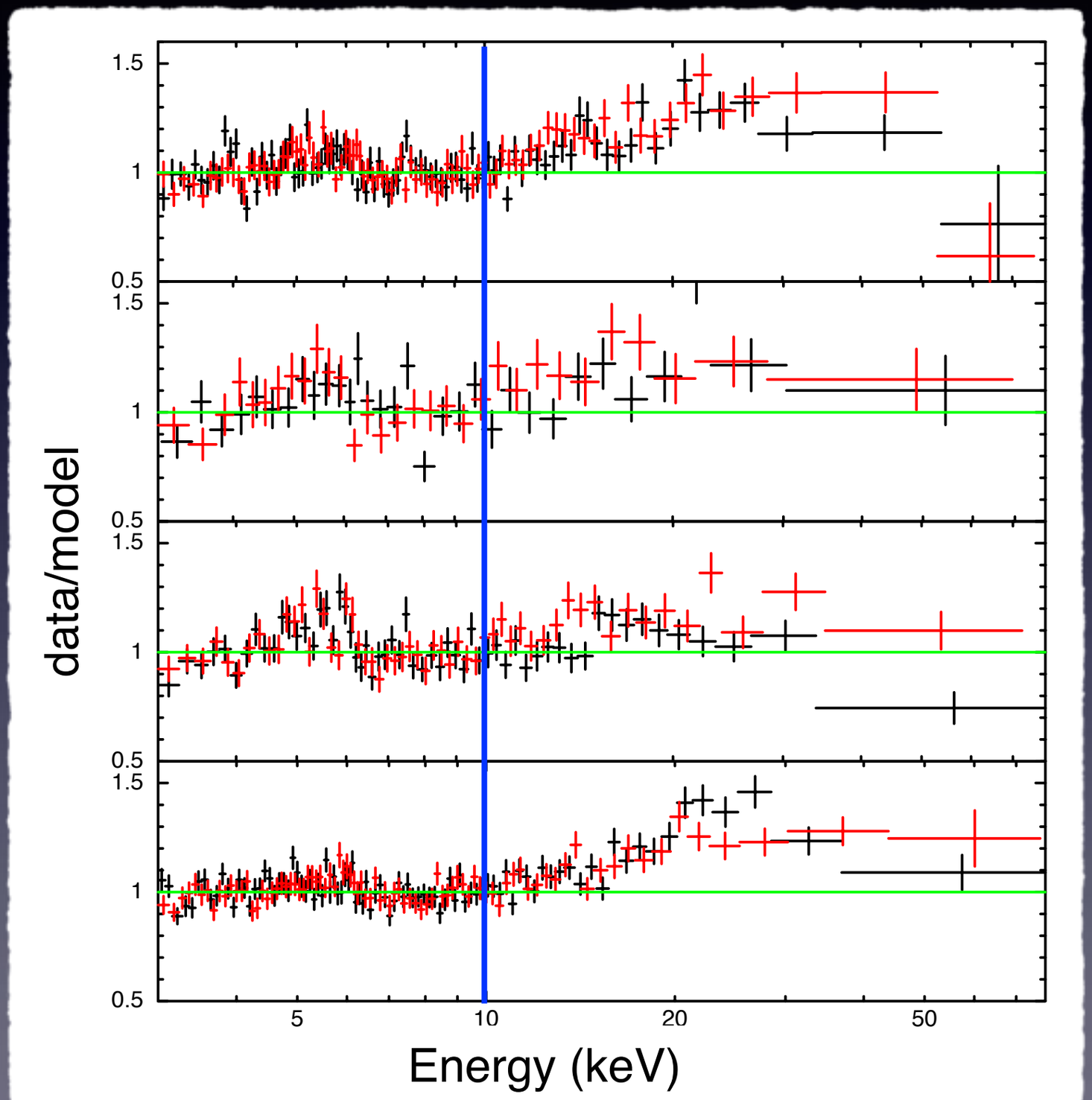

Residuals at 6.4 keV

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and at the energy of the Compton hump

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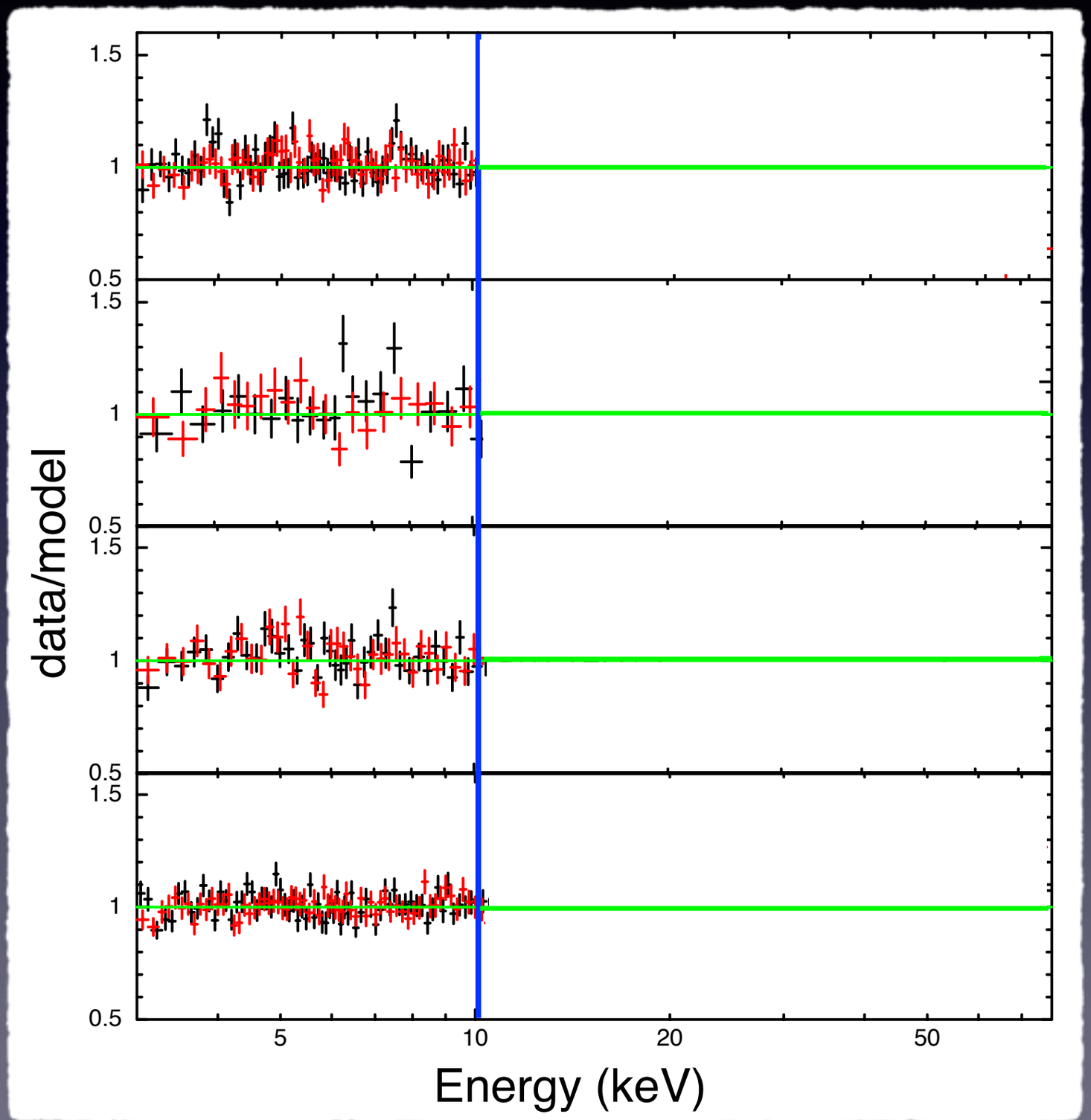

Model:
(cutoffpl+pexmon+relconv*pexmon)

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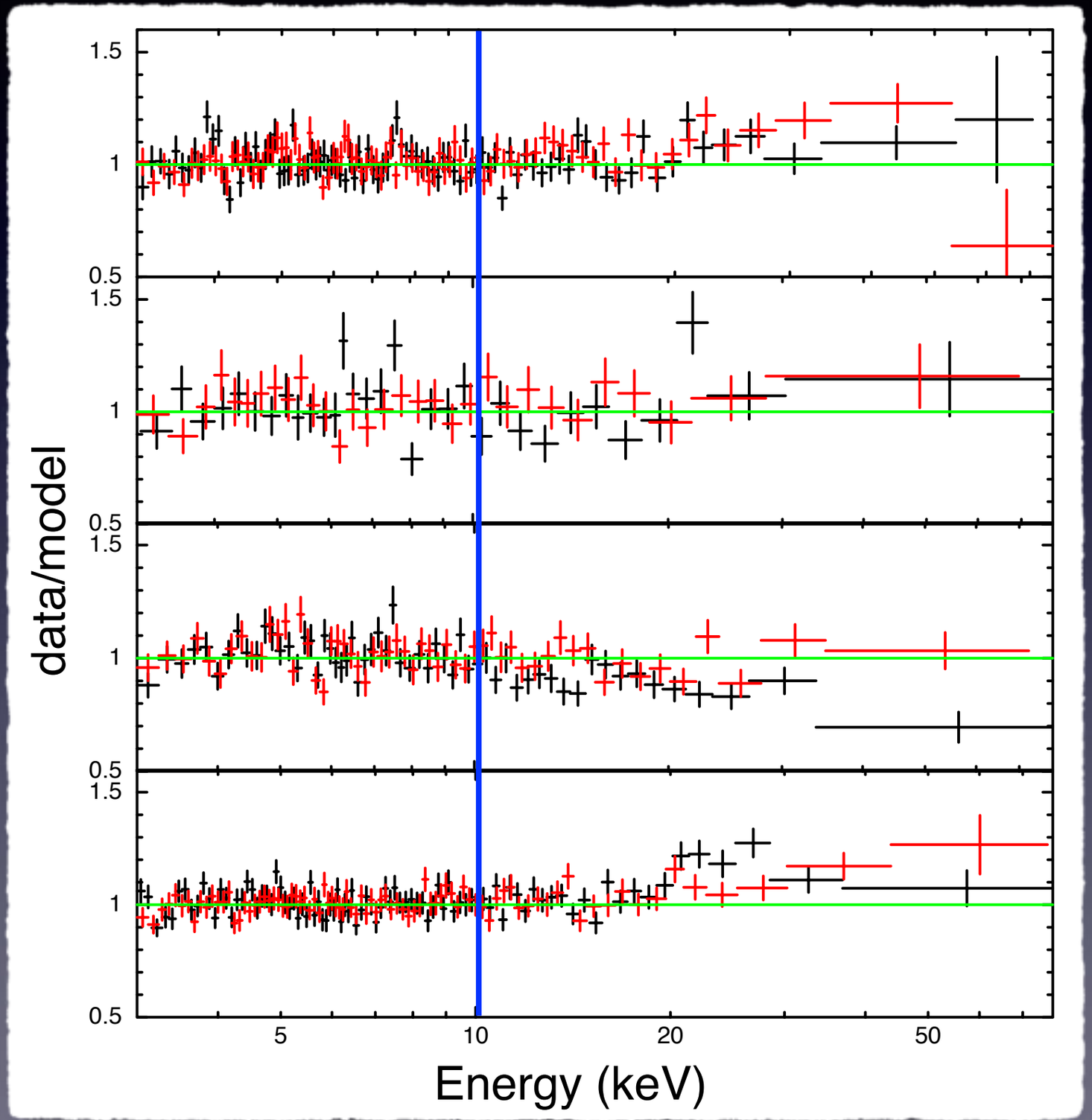
Mantovani et al., under sub.



The physically motivated self-consistent model perfectly estimates the data at the energies of the Compton hump

Model:
(cutoffpl+pexmon+relconv*pexmon)

Conclusions

- Relativistic Fe line ubiquitous in Seyfert 1
- Both narrow and broad Fe line tracing emission of the Compton hump